

## CLAIMS

What is claimed is:

1. A catalyst for use in electrochemical reactor devices, the catalyst containing platinum at a concentration that is between about 20 and about 60 atomic percent, ruthenium at a concentration that is between about 20 and about 60 atomic percent, palladium at a concentration that is between about 5 and about 45 atomic percent, and having an atomic ratio of platinum to ruthenium that is between about 0.7 and about 1.2.

2. The catalyst of claim 1 wherein the concentration of platinum is between about 25 and about 50 atomic percent, and the concentration of ruthenium is between about 25 and about 55 atomic percent.

3. The catalyst of claim 1 wherein the atomic ratio of platinum to ruthenium is between about 0.7 and about 1.0.

4. The catalyst of claim 1 wherein the concentration of platinum is between about 30 and about 45 atomic percent, and the concentration of ruthenium is between about 35 and about 50 atomic percent.

5. The catalyst of claim 4 wherein the atomic ratio of platinum to ruthenium is between about 0.7 and about 1.0.

6. The catalyst of claim 1 wherein the concentration of platinum is between about 30 and about 40 atomic percent, and the concentration of ruthenium is between about 35 and about 45 atomic percent.

7. The catalyst of claim 6 wherein the atomic ratio of platinum to ruthenium is between about 0.7 and about 1.0.

8. The catalyst of claim 1 wherein the catalyst is an alloy.

9. A catalyst for use in electrochemical reactor devices, the catalyst containing platinum at a concentration that is between about 25 and about 50 atomic percent, ruthenium at a concentration that is between about 25 and about 55 atomic percent, palladium at a concentration that is between about 5

and about 45 atomic percent, and having a difference between the concentrations of ruthenium and platinum that is no greater than about 20 atomic percent.

10. The catalyst of claim 9 wherein the difference between the concentrations of ruthenium and platinum is no greater than about 15 atomic percent.

11. The catalyst of claim 9 wherein the difference between the concentrations of ruthenium and platinum is no greater than about 10 atomic percent.

12. The catalyst of claim 9 wherein the concentration of platinum is between about 30 and about 45 atomic percent and the concentration of ruthenium is between about 35 and about 50 atomic percent.

13. The catalyst of claim 12 wherein the difference between the concentrations of ruthenium and platinum is no greater than about 15 atomic percent.

14. The catalyst of claim 12 wherein the difference between the concentrations of ruthenium and platinum is no greater than about 10 atomic percent.

15. The catalyst of claim 9 wherein the concentration of platinum is between about 30 and about 40 atomic percent and the concentration of ruthenium is between about 35 and about 45 atomic percent.

16. The catalyst of claim 9 wherein catalyst is an alloy.